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Advanced Instrumentation and Its Uses

[*]Manu Mitra

[*]IEEE Member, Alumnus with Electrical Engineering Department University of Bridgeport, USA

Introduction

Instrumentation and control system plays a very vital role in gathering information from the field and changing field parameters; for instance control loops. Instrumentation technology moves towards the development of intelligent sensors, smart transducers, Micro Electro Mechanical Systems (MEMS), blue tooth technology, etc. In short it deals with measurement, automation and control process. Few of them are considered below from plentiful advanced technologies research which will support human kind in long run [1].

Instrument to Test if Drugs Contain Crystallinity

Solid form of active pharmaceutical constituent can extremely influence the proportion of drug that can enter the body and have an effect. Many new drug contenders have low aqueous solubility, which leads to lower bioavailability. If a drug doesn't dissolve in a timely manner, it can pass through a body before the time to take effect.

Researchers at Purdue University have designed an instrument that can rapidly and economically determine whether new pharmaceutical formulations have trace of crystallinity that can negatively affect drugs stability and bioavailability [2].

Butterfly Stimulated Camera for Image Guided Cancer Surgery

"In surgery it is very vital that all cancerous tissues are removed and an imaging platform could help surgeons do this in any hospital across the world because it is small, compact and economical" was confirmed by Prof. Viktor Gruev from the University of Illinois at Urbana-Champaign. Also, they have addressed the instrumentation side, fluorescent markers targeted for cancer and approved for use in people are needed for technology to find widespread application.

This new camera was inspired by butterfly eyes that improve image guided cancer surgery. It offers very sensitive florescence detection even under standard operating room and it weighs less than an AA battery and be made for around twenty dollars [3].

Mapping of Nanoscale Chemical Reactions inside Batteries

As battery charges and discharges, it's electrodes and materials where reactions that produce energy are alternately oxidized and reduced. The chemical pathways by which these reactions take place to determine how fast battery becomes exhausted. A new technique called X-ray ptychographic tomography that was partnership between chemists at UIC and scientist at the Advanced Light Source at Lawrence Berkeley National Laboratory in California. Advanced Light Source Scientist created instrumentation and measurement algorithms which were used to assist in answering important questions about battery materials and behavior identified by the UIC team

As a result, researchers from University of Illinois at Chicago and Lawrence Berkeley National Laboratory have designed a new technique that lets them pin point the position of chemical reactions happening inside lithium-ion batteries in three dimensions at nanoscale level [4].

***Corresponding author:** Manu Mitra, EEE Member, Alumnus with Electrical Engineering Department University of Bridgeport, USA. E-mail: mmitra@my.bridgeport.edu

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New Instrument for Single Cell Analysis in Rheumatoid Arthritis Patients

Single cell analysis holds massive potential to study individual cells influence disease and respond to treatment, but shortage of cost effective and user friendly instrumentation remains challenging.

Experts at New York Genome Center (NYGC) and New York University (NYU) have taken steps to simplify broad access to single cell sequencing by creating a 3 dimension printed, portable and economical micro fluidic controller. To validate the utility of the instrument in clinical environments, researchers installed the device to study synovial tissue from patients with rheumatoid arthritis (RA) at the Hospital for Special Surgery (HSS) [5].

Novel Instrument that Makes Nuclear Magnetic Resonance (Nmr) More Useful for Nanomaterials

Nuclear Magnetic Resonance (NMR) involves applying a strong magnetic field to trial and then zapping it with pulses of radio waves. The magnetic field supports the magnetic moments of atomic nuclei in the opposite way, depending on the frequency of the waves. Experts can use the signal associated of spin flips at different frequencies to create images to determine trials molecular structure. Nuclear Magnetic Resonance is a powerful scientific tool used in medical imaging and in examining the chemical structure of molecules and compounds.

Scientist from Brown University shows a method that helps to adapt Nuclear Magnetic Resonance to study physical properties of thin films and two dimensional nanomaterials and exotic states of matter [6].

In conclusion, SciFed Journal of Instrumentation will be dedicated to continue its focus with the international research community to achieve strongest possible scientific picture on coming up extent of horizon for exceptional quality for human kind.

References

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